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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/966,958	09/28/2001	Ping-Hung Lu	2001US307	4914

7590

07/25/2003

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EXAMINER

LEE, SIN J

ART UNIT

PAPER NUMBER

1752

5

DATE MAILED: 07/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

AS-5

Office Action Summary

Application No.

09/966,958

Applicant(s)

LU ET AL.

Examiner

Sin J Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 September 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-7,9-11,13 and 14 is/are rejected.
- 7) ☒ Claim(s) 2,8 and 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 September 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2-4. 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 3-7, 9-11, 13, and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Ushirogouchi et al (5,691,101).

Ushirogouchi teaches (see col.2, lines 13-23, lines 42-61, col.3, lines 32-43) a *water-soluble, negative type* photosensitive composition containing *an acid-generating compound, which is water-soluble*, and an acid crosslinkable resin having repeating units represented by the formulas (1) and (2) shown in col.2, lines 50-57. The formula (2) teaches presently claimed additional nonaromatic unit of ethylenic alcohol in claims 4 and 5. Specifically, Ushirogouchi makes a polyvinyl *butyral* resin in their Example 1, and Ushirogouchi's resin teaches present polymer having the unit (1) of claim 1 since present n can be 1 and present R₁ can be a C₄ alkyl group. Ushirogouchi furthermore teaches (col.11, lines 66-67, col.12, lines 1-10) that his photosensitive composition may contain an acid-crosslinkable compound such as a melamine resin (*present crosslinker of claim 9*). Based on this teaching, one of ordinary skill in the art would immediately envisage adding a melamine resin to Ushirogouchi's photosensitive

composition. Ushirogouchi also teaches (col.14, lines 3-33) that an *aqueous solution* (which means that water is used as the solvent) of his photosensitive composition or an aqueous solution added with a small amount of alcohol is prepared. The prepared resist solution is coated on a substrate, and after the solvent is vaporized by heating, the resist layer is exposed to UV radiation with a wavelength of 340 nm or more. Then, post exposure baking is performed, and then the resist layer is *developed with water* to form a pattern. Therefore, the prior art teaches present inventions of claims 1, 3-5, 7, 9, 11, and 13.

With respect to present claim 6, Ushirogouchi teaches (col.7, lines 41-44, col.11, lines 28-36) that the total amount of the repeating unit (1) of their acid-crosslinkable resin is preferably 1-20 wt% of the entire resin. Since 20 wt% is included as the higher end of the taught range, one of ordinary skill in the art would immediately envisage having 20 wt% of the repeating unit (1) of Ushirogouchi's acid-crosslinkable resin. Therefore, the prior art teaches present invention of claim 6.

With respect to present claim 10, the claim language does not require the solvent composition of claim 3 to be the mixture of water and isopropanol. The claim 10 is saying that *if* the solvent composition of claim 3 were to be a mixture of water and a C₁-C₄ alkyl alcohol, then the alcohol is required to be an isopropanol. Therefore, Ushirogouchi still teaches present invention of claim 10.

With respect to present claim 14, the claim language does not require the developer of claim 13 to be the mixture of water and isopropanol. The claim 14 is saying that *if* the developer

of claim 13 were to be a mixture of water and a C₁-C₄ alkyl alcohol, then the alcohol is required to be an isopropanol. Therefore, Ushirogouchi still teaches present invention of claim 14.

Allowable Subject Matter

3. Claims 2, 8, and 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Ushirogouchi et al uses triphenylsulfonium trifluoromethane sulfonate as their photoacid generator, and the prior art does not teach or suggest the use of the present photoactive compound of formula (2) of claim 2. Also, the prior art teaches the use of light having wavelength of 340 nm or more and thus does not teach or suggest the present invention of claim 12.

Havard et al (*Macromolecules* 1999, vol.32, pg.86-94) teaches the present photoacid generator of claims 2 and 8, which is (4-methoxyphenyl)dimethylsulfonium trifluoromethanesulfonate. However, the reference does not teach the present polymer of the formula (1). Also, the reference does not teach or suggest the equivalence of its PAG to triphenylsulfonium trifluoromethane sulfonate, which is taught in Ushirogouchi et al.

Kanda et al (*Advances in Resist Technology and Processing XVII*, vol.3999, pg.881-889) uses AZ R200 coating material which, according to present specification, is a mixture of polyvinylacetal and ethylene urea resin (present crosslinker) in a water/isopropanol 94/6 wt.% solution. However, this coating material is not mixed with a photoacid generator, but instead is

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reacted with *acid* (which is not a photoacid generator) in RELACS process (Resolution Enhancement Lithography Assisted by Chemical Shrink).

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is (703) 305-0504. The examiner can normally be reached on Monday-Friday from 8:30 am EST to 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ms. Janet Baxter, can be reached on (703) 308-2303. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9311 for after final responses or (703) 872-9310 for before final responses.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-0661.

S. J. Lee

S. Lee
7/23/03



JANET BAXTER
SUPERVISORY PATENT EXAMINER
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